

Title 26. DEPARTMENT OF THE ENVIRONMENT

Subtitle 8. WATER POLLUTION

Chapter 2. WATER QUALITY AUTHORITY

Authority: Environment Article, §9-303.1, 9-313—9-316, 9-319, 9-320—9-325, 9-327, and 9-328, Annotated Code of Maryland

.03-2 Numerical Criteria for Toxic Substances in Surface Waters.

A.—C. (text unchanged.)

D. The toxicity of certain substances in Tables 1 and [4]6 of §G of this regulation is increased or decreased by hardness or pH. For these toxic substances:

(1)—(4) (text unchanged.)

E. (text unchanged.)

F. Acute and chronic numeric toxic substance criteria for fresh, estuarine, and salt water aquatic life protection and for human health protection are shown in Tables 1—[4]6 of §G. For the instream application of the acute and chronic criteria for the protection of aquatic life in Tables 1—[4]6 of §G of this regulation:

(1)—(3) (text unchanged.)

G. Tables of Ambient Water Quality Criteria.

(1)—(5) (text unchanged.)

(6) Table 6. Toxic Substances for Ambient Water Quality Criteria — Pesticides and Chlorinated Compounds.

Substance	CAS#	Aquatic Life ($\mu\text{g}/\text{L}$)				Human Health for Consumption of:		
		Fresh Water		Salt Water		Drinking Water + Organism ($\mu\text{g}/\text{L}$)	Organism Only ($\mu\text{g}/\text{L}$)	Drinking Water MCL (mg/L)
		Acute	Chronic	Acute	Chronic			
2, 3, 7, 8-TCDD (Dioxin)	1746016					0.00000005 ^a	0.00000051 ^a	3×10^{-8}
4,4'-DDD	72548					0.0012 ^a	0.0012 ^a	
4,4'-DDE	72559					0.0018 ^a	0.0018 ^a	
4,4'-DDT	50293	1.1	0.001	0.13	0.001	0.0003 ^a	0.0003 ^a	
Aldrin	309002	3		1.3		0.0000077 ^a	0.0000077 ^a	
alpha-BHC	319846					0.036 ^a	0.039 ^a	
alpha-Endosulfan	959988	0.22	0.056	0.034	0.0087	20	30	
Atrazine	1912249					3		0.003
beta-BHC	319857					0.08 ^a	0.14 ^a	
beta-Endosulfan	33213659	0.22	0.056	0.034	0.0087	20	40	
Carbaryl	63252	2.1	2.1	1.6				
Chlordane	57749	2.4	0.0043	0.09	0.004	0.0031 ^a	0.0032 ^a	0.002
Chlorpyrifos	2921882	0.083	0.041	0.011	0.0056			
Diazinon	333415	0.17	0.17	0.82	0.82			
Dieldrin	60571	0.24	0.056	0.71	0.0019	0.000012 ^a	0.000012 ^a	
Endosulfan Sulfate	1031078					20	40	
Endrin	72208	0.086	0.036	0.037	0.0023	0.059	0.060	0.002
Endrin Aldehyde	7421934					1	1	
gamma-BHC (Lindane)	58899	0.95		0.16		4.2	4.4	0.0002
Heptachlor	76448	0.52	0.0038	0.053	0.0036	0.000059 ^a	0.000059 ^a	0.0004

Substance	CAS#	Aquatic Life ($\mu\text{g/L}$)				Human Health for Consumption of:			
		Fresh Water		Salt Water		Drinking Water + Organism ($\mu\text{g/L}$)	Organism Only ($\mu\text{g/L}$)	Drinking Water MCL (mg/L)	
		Acute	Chronic	Acute	Chronic				
Heptachlor Epoxide	1024573	0.52	0.0038	0.053	0.0036	0.00032 ^a	0.00032 ^a	0.0002	
Polychlorinated Biphenyls PCBs			0.014		0.03	0.00064 ^a	0.00064 ^a	0.0005	
Toxaphene	8001352	0.73	0.002	0.21	0.002	0.007 ^a	0.0071 ^a	0.003	
Tributyltin (TBT)		0.46	0.072	0.42	0.0074				
Pentachlorobenzene	608935					0.1	0.1		
Pentachlorophenol (PCP) ¹	87865	19	15	13	7.9	2.7 ^a	30 ^a	0.001	

¹The freshwater aquatic life criteria for PCP are expressed as a function of pH. Refer to §D of this regulation.

^a Criterion is based on a carcinogenic risk level of 10^{-5} .

* Drinking water MCLs apply to Public Water Supply designated waters only.

H. (text unchanged.)

I. Chronic Numeric Toxic Substance Criteria for Ammonia, Expressed as a 30-day Average, for the Protection of Fresh Water Aquatic Life.

(1)—(4) (text unchanged.)

(5) Table 1. Chronic Ammonia Criteria for Waters Where Freshwater Fish Early Life Stages May Be Present (milligrams of nitrogen per liter).¹ [

pH	Temperature ($^{\circ}\text{C}$)																							
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.5	4.9	4.6	4.3	4.0	3.8	3.6	3.3	3.1	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.6	1.5	1.4	1.4	1.3	1.2	1.1
6.6	4.8	4.5	4.3	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
6.7	4.7	4.4	4.2	3.9	3.7	3.4	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
6.8	4.6	4.3	4.1	3.8	3.6	3.4	3.1	3.0	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.5	1.5	1.4	1.3	1.2	1.1	1.1
6.9	4.5	4.2	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	
7	4.3	4.1	3.8	3.6	3.4	3.1	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.5	1.5	1.4	1.3	1.2	1.1	1.1	1.0
7.1	4.2	3.9	3.7	3.4	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9
7.2	3.9	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.1	1.0	0.9
7.3	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.1	1.0	0.9	0.8
7.4	3.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.8
7.5	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7
7.6	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.6
7.7	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.6	1.5	1.4	1.4	1.3	1.2	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6
7.8	2.3	2.1	2.0	1.9	1.8	1.7	1.5	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5
7.9	2.0	1.9	1.7	1.6	1.5	1.4	1.4	1.3	1.2	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5
8	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4
8.1	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3
8.2	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
8.3	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	
8.4	0.9	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	

	Temperature (°C)																							
8.5	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
8.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1
8.7	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
8.8	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
8.9	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

]

	Temperature (°C)																								
pH	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
6.5	4.92	4.61	4.33	4.06	3.80	3.57	3.34	3.13	2.94	2.75	2.58	2.42	2.27	2.13	2.00	1.87	1.75	1.64	1.54	1.45	1.36	1.27	1.19	1.12	
6.6	4.85	4.54	4.26	3.99	3.75	3.51	3.29	3.09	2.89	2.71	2.54	2.38	2.24	2.10	1.97	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17	1.10	
6.7	4.76	4.46	4.18	3.92	3.68	3.45	3.23	3.03	2.84	2.66	2.50	2.34	2.19	2.06	1.93	1.81	1.70	1.59	1.49	1.40	1.31	1.23	1.15	1.08	
6.8	4.65	4.36	4.08	3.83	3.59	3.37	3.16	2.96	2.77	2.60	2.44	2.29	2.14	2.01	1.88	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.05	
6.9	4.52	4.23	3.97	3.72	3.49	3.27	3.07	2.88	2.70	2.53	2.37	2.22	2.08	1.95	1.83	1.72	1.61	1.51	1.42	1.33	1.24	1.17	1.09	1.03	
7	4.36	4.09	3.84	3.60	3.37	3.16	2.96	2.78	2.60	2.44	2.29	2.15	2.01	1.89	1.77	1.66	1.56	1.46	1.37	1.28	1.20	1.13	1.06	0.99	
7.1	4.18	3.92	3.68	3.45	3.23	3.03	2.84	2.66	2.50	2.34	2.20	2.06	1.93	1.81	1.70	1.59	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.95	
7.2	3.98	3.73	3.50	3.28	3.07	2.88	2.70	2.53	2.38	2.23	2.09	1.96	1.84	1.72	1.61	1.51	1.42	1.33	1.25	1.17	1.10	1.03	0.96	0.90	
7.3	3.75	3.51	3.29	3.09	2.90	2.72	2.55	2.39	2.24	2.10	1.97	1.84	1.73	1.62	1.52	1.43	1.34	1.25	1.17	1.10	1.03	0.97	0.91	0.85	
7.4	3.49	3.28	3.07	2.88	2.70	2.53	2.37	2.23	2.09	1.96	1.83	1.72	1.61	1.51	1.42	1.33	1.25	1.17	1.10	1.03	0.96	0.90	0.85	0.79	
7.5	3.22	3.02	2.83	2.66	2.49	2.33	2.19	2.05	1.92	1.80	1.69	1.59	1.49	1.39	1.31	1.22	1.15	1.08	1.01	0.95	0.89	0.83	0.78	0.73	
7.6	2.94	2.75	2.58	2.42	2.27	2.13	1.99	1.87	1.75	1.64	1.54	1.44	1.35	1.27	1.19	1.12	1.05	0.98	0.92	0.86	0.81	0.76	0.71	0.67	
7.7	2.64	2.48	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39	1.30	1.22	1.14	1.07	1.00	0.94	0.88	0.83	0.78	0.73	0.68	0.64	0.60	
7.8	2.35	2.20	2.07	1.94	1.82	1.70	1.60	1.50	1.40	1.32	1.23	1.16	1.08	1.02	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53	
7.9	2.07	1.94	1.82	1.70	1.60	1.50	1.40	1.32	1.23	1.16	1.08	1.02	0.95	0.89	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.53	0.50	0.47	
8	1.80	1.68	1.58	1.48	1.39	1.30	1.22	1.14	1.07	1.01	0.94	0.88	0.83	0.78	0.73	0.68	0.64	0.60	0.56	0.53	0.49	0.46	0.43	0.41	
8.1	1.55	1.45	1.36	1.28	1.20	1.12	1.05	0.99	0.92	0.87	0.81	0.76	0.71	0.67	0.63	0.59	0.55	0.52	0.49	0.45	0.43	0.40	0.37	0.35	
8.2	1.32	1.24	1.16	1.09	1.02	0.96	0.90	0.84	0.79	0.74	0.69	0.65	0.61	0.57	0.54	0.50	0.47	0.44	0.41	0.39	0.36	0.34	0.32	0.30	
8.3	1.13	1.05	0.99	0.93	0.87	0.82	0.76	0.72	0.67	0.63	0.59	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27	0.26	
8.4	0.95	0.89	0.84	0.78	0.74	0.69	0.65	0.61	0.57	0.53	0.50	0.47	0.44	0.41	0.39	0.36	0.34	0.32	0.30	0.28	0.26	0.25	0.23	0.22	
8.5	0.80	0.75	0.71	0.66	0.62	0.58	0.55	0.51	0.48	0.45	0.42	0.40	0.37	0.35	0.33	0.31	0.29	0.27	0.25	0.24	0.22	0.21	0.19	0.18	
8.6	0.68	0.64	0.60	0.56	0.52	0.49	0.46	0.43	0.41	0.38	0.36	0.33	0.31	0.29	0.28	0.26	0.24	0.23	0.21	0.20	0.19	0.18	0.16	0.15	
8.7	0.57	0.54	0.50	0.47	0.44	0.42	0.39	0.37	0.34	0.32	0.30	0.28	0.27	0.25	0.23	0.22	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.13	
8.8	0.49	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27	0.26	0.24	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.13	0.12	0.11	
8.9	0.42	0.39	0.37	0.34	0.32	0.30	0.28	0.27	0.25	0.23	0.22	0.21	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09		

9	0.36	0.34	0.32	0.30	0.28	0.26	0.24	0.23	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.09	0.08
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¹ The freshwater chronic water quality criteria for total ammonia where fish early life stages may be present were calculated using the following equation, which may also be used to calculate unlisted values:

Freshwater chronic water quality criterion for ammonia (fish early life stages present) =

$$[\left[0.9405 * \left(\frac{0.0278}{1 + 10^{7.688-pH}} + \frac{1.1994}{1 + 10^{pH-7.688}} \right) * \text{MIN} \left(\begin{array}{l} 6.920, \\ 7.547 * 10^{0.028 * (20-T)} \end{array} \right) \right] \\ CCC = 0.8876 * \left(\frac{0.0278}{1 + 10^{7.688-pH}} + \frac{1.1994}{1 + 10^{pH-7.688}} \right) * (2.126 * 10^{0.028 * (20-\text{MAX}(T,7))})$$

[Where MIN indicates the lesser of the two values separated by a comma.] Where MAX indicates the greater of the two values separated by a comma.

(6) Table 2. Chronic Ammonia Criteria for Waters Where Freshwater Fish Early Life Stages Are Present and Freshwater mussels are absent (milligrams of nitrogen per liter).¹ [

pH	Temperature(°C)															
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
6.5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.0	6.6	6.2	5.8	5.4	5.1	4.8	4.5	4.2
6.6	7.2	7.2	7.2	7.2	7.2	7.2	7.2	6.9	6.5	6.1	5.7	5.3	5.0	4.7	4.4	4.1
6.7	7.1	7.1	7.1	7.1	7.1	7.1	7.1	6.8	6.4	6.0	5.6	5.2	4.9	4.6	4.3	4.1
6.8	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.6	6.2	5.8	5.5	5.1	4.8	4.5	4.2	4.0
6.9	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.4	6.0	5.7	5.3	5.0	4.7	4.4	4.1	3.8
7	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.2	5.8	5.5	5.1	4.8	4.5	4.2	4.0	3.7
7.1	6.2	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.6	5.2	4.9	4.6	4.3	4.0	3.8	3.6
7.2	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.6	5.3	5.0	4.7	4.4	4.1	3.8	3.6	3.4
7.3	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.3	5.0	4.7	4.4	4.1	3.8	3.6	3.4	3.2
7.4	5.2	5.2	5.2	5.2	5.2	5.2	5.2	4.9	4.6	4.3	4.1	3.8	3.6	3.4	3.1	2.9
7.5	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.5	4.3	4.0	3.7	3.5	3.3	3.1	2.9	2.7
7.6	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.1	3.9	3.6	3.4	3.2	3.0	2.8	2.6	2.5
7.7	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.7	3.5	3.2	3.0	2.9	2.7	2.5	2.3	2.2
7.8	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	1.9
7.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7
8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5
8.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2
8.2	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.5	1.5	1.4	1.3	1.2	1.1	1.1
8.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9
8.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7
8.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6
8.6	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5
8.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4
8.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3
8.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2

	Temperature (°C)																												
P	H	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
6.	5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.0	6.6	6.1	5.8	5.4	5.1	4.7	4.4	4.2	4.0	3.8	3.6	3.0	
		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	9	0	4	0	8	8	0	8	8	0	
6.	6	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	6.9	6.5	6.0	5.7	5.3	5.0	4.7	4.4	4.1	4.0	3.8	3.6	3.0
		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	9	1	6	2	1	1	4	1	1	4	
6.	7	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	6.8	6.3	5.9	5.6	5.2	4.9	4.6	4.3	4.0	3.8	3.6	3.0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	1	6	3	2	3	6	3	2	3	
6.	8	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.6	6.2	5.8	5.4	5.1	4.8	4.5	4.2	3.9	3.7	3.5	3.0	
		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3	4	8	4	1	1	3	7	3	7	
6.	9	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.4	6.0	5.6	5.3	4.9	4.6	4.3	4.1	3.8	3.6	3.4	3.2	3.0	
		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6	6	8	2	9	8	9	1	6	6	8	6	
6.	7	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.2	5.8	5.4	5.1	4.8	4.5	4.2	3.9	3.7	3.5	3.3	3.1	3.0	
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	5	8	4	2	2	4	7	3	7			
7.	1	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	5.9	5.6	5.2	4.9	4.6	4.3	4.0	3.8	3.5	3.3	3.1	3.0	
		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	8	1	6	3	2	3	6	1	7				
7.	2	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.6	5.3	5.0	4.6	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2	0	
		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	9	3	0	9	0	2	6	2	0	2			
7.	3	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.3	5.0	4.7	4.4	4.1	3.8	3.6	3.4	3.2	3.0	2	1	0	
		9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	3	1	2	4	8	4	1	0	1			
7.	4	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.0	4.6	4.3	4.1	3.8	3.6	3.3	3.1	2.9	2.7	2.5	2.3	2.2	
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	9	9	2	6	2	9	8	8	7			
7.	5	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.6	4.3	4.0	3.8	3.5	3.3	3.1	2.9	2.7	2.5	2.3	2.1	2.0	
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	5	0	6	4	3	3	5	5			
7.	6	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.2	3.9	3.6	3.4	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.1	2.0	
		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0	4	9	6	4	5	7	1	1	0	1		
7.	7	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.9	1.8	
		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	8	2	1	2	4	7	1	1	6				
7.	8	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.1	2.9	2.7	2.6	2.4	2.2	2.1	2.0	1.9	1.8	1.7	1.6	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	7	0	3	8	4	1	0	1			
7.	9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.7	2.6	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	
		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	5	7	0	3	8	4	1	1	8	6			
8.	8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.4	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	1	6	2	9	6	5	4	3			
8.	1	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.0	1.0	
		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	9	7	6	7	9	1	0	1	2	1		
8.	2	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.4	1.3	1.2	1.1	1.0	1.0	0.9	0.8	0.7	0.6	0.5	
		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	1	1	1	1	1	1	1	1	1	1		
8.	3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.2	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.7	0.6	0.5	0.4	
		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	6	8	0	2	5	9	2	7	1			
8.	4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.0	1.0	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	1	5	9	3	8	3	9	0			
8.	5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1	0.0	0.0	0.0	
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	1	5	0	5	0	6	2	8	8	8	
8.	6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.3	0.2	0.1	
		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2	7	2	8	3	0	6	2	9	9	9	
8.	7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.3	0.2	0.1	0.0
		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	5	1	8	4	1	7	4	4	2	0	

8.9	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
9.4	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54

¹The freshwater chronic water quality criteria for total ammonia where fish early life stages are present but freshwater mussels are absent were calculated using the following equation, which may also be used to calculate unlisted values:

Freshwater chronic water quality criterion for ammonia (fish early life stages present and freshwater mussels absent) =CCC=

$$\left[0.9405 * \left(\frac{0.0278}{1 + 10^{7.688 - pH}} + \frac{1.1994}{1 + 10^{pH - 7.688}} \right) * \text{MIN} \left(\begin{array}{l} 6.920, \\ 7.547 * 10^{0.028 * (20 - T)} \end{array} \right) \right]$$

Where MIN indicates the lesser of the two values separated by a comma.

(7) Table 3. Chronic Ammonia Criteria for Waters Where Freshwater Fish Early Life Stages Are Absent and Freshwater Mussels Are Absent (milligrams of nitrogen per liter).¹ [

Temperature(°C)																								
6.5	18.5	17.3	16.2	15.2	14.3	13.4	12.6	11.8	11.0	10.3	9.7	9.1	8.5	8.0	7.5	7.0	6.6	6.2	5.8	5.4	5.1	4.8	4.5	4.2
6.6	18.2	17.1	16.0	15.0	14.1	13.2	12.4	11.6	10.9	10.2	9.6	9.0	8.4	7.9	7.4	6.9	6.5	6.1	5.7	5.3	5.0	4.7	4.4	4.1
6.7	17.8	16.7	15.7	14.7	13.8	12.9	12.1	11.4	10.7	10.0	9.4	8.8	8.2	7.7	7.2	6.8	6.4	6.0	5.6	5.2	4.9	4.6	4.3	4.1
6.8	17.4	16.3	15.3	14.4	13.5	12.6	11.8	11.1	10.4	9.8	9.1	8.6	8.0	7.5	7.1	6.6	6.2	5.8	5.5	5.1	4.8	4.5	4.2	4.0
6.9	16.9	15.9	14.9	13.9	13.1	12.3	11.5	10.8	10.1	9.5	8.9	8.3	7.8	7.3	6.9	6.4	6.0	5.7	5.3	5.0	4.7	4.4	4.1	3.8
7	16.3	15.3	14.4	13.5	12.6	11.8	11.1	10.4	9.8	9.1	8.6	8.0	7.5	7.1	6.6	6.2	5.8	5.5	5.1	4.8	4.5	4.2	4.0	3.7
7.1	15.6	14.7	13.8	12.9	12.1	11.3	10.6	10.0	9.3	8.8	8.2	7.7	7.2	6.8	6.3	5.9	5.6	5.2	4.9	4.6	4.3	4.0	3.8	3.6
7.2	14.9	13.9	13.1	12.2	11.5	10.8	10.1	9.5	8.9	8.3	7.8	7.3	6.9	6.4	6.0	5.6	5.3	5.0	4.7	4.4	4.1	3.8	3.6	3.4
7.3	14.0	13.1	12.3	11.5	10.8	10.1	9.5	8.9	8.3	7.8	7.3	6.9	6.4	6.0	5.7	5.3	5.0	4.7	4.4	4.1	3.8	3.6	3.4	3.2
7.4	13.0	12.2	11.4	10.7	10.0	9.4	8.8	8.3	7.8	7.3	6.8	6.4	6.0	5.6	5.3	4.9	4.6	4.3	4.1	3.8	3.6	3.4	3.1	2.9
7.5	11.9	11.2	10.5	9.8	9.2	8.6	8.1	7.6	7.1	6.7	6.3	5.9	5.5	5.2	4.8	4.5	4.3	4.0	3.7	3.5	3.3	3.1	2.9	2.7
7.6	10.8	10.2	9.5	8.9	8.4	7.8	7.4	6.9	6.5	6.1	5.7	5.3	5.0	4.7	4.4	4.1	3.9	3.6	3.4	3.2	3.0	2.8	2.6	2.5
7.7	9.7	9.1	8.5	8.0	7.5	7.0	6.6	6.2	5.8	5.4	5.1	4.8	4.5	4.2	3.9	3.7	3.5	3.2	3.0	2.9	2.7	2.5	2.3	2.2
7.8	8.6	8.0	7.5	7.1	6.6	6.2	5.8	5.5	5.1	4.8	4.5	4.2	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	1.9
7.9	7.5	7.0	6.6	6.2	5.8	5.4	5.1	4.8	4.5	4.2	3.9	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7
8	6.5	6.0	5.7	5.3	5.0	4.7	4.4	4.1	3.9	3.6	3.4	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5
8.1	5.5	5.2	4.8	4.5	4.2	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.2
8.2	4.6	4.3	4.1	3.8	3.6	3.4	3.1	2.9	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.5	1.5	1.4	1.3	1.2	1.1	1.1
8.3	3.9	3.6	3.4	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9
8.4	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7
8.5	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6
8.6	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5
8.7	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4
8.8	1.4	1.3	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.3
8.9	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3
9	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2

] [

Temperature (°C)																								
pH	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

6.5	18.5	17.4	16.3	15.3	14.3	13.4	12.6	11.8	11.1	10.4	9.72	9.11	8.54	8.01	7.51	7.04	6.60	6.19	5.80	5.44	5.10	4.78	4.48	4.20
6.6	18.2	17.1	16.0	15.0	14.1	13.2	12.4	11.6	10.9	10.2	9.57	8.97	8.41	7.89	7.39	6.93	6.50	6.09	5.71	5.36	5.02	4.71	4.41	4.14
6.7	17.9	16.8	15.7	14.7	13.8	13.0	12.2	11.4	10.7	10.0	9.39	8.80	8.25	7.74	7.25	6.80	6.38	5.98	5.61	5.26	4.93	4.62	4.33	4.06
6.8	17.5	16.4	15.4	14.4	13.5	12.7	11.9	11.1	10.4	9.78	9.17	8.60	8.06	7.56	7.09	6.65	6.23	5.84	5.48	5.14	4.81	4.51	4.23	3.97
6.9	17.0	15.9	14.9	14.0	13.1	12.3	11.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06	5.68	5.32	4.99	4.68	4.39	4.11	3.86
7	16.4	15.4	14.4	13.5	12.7	11.9	11.1	10.5	9.80	9.19	8.61	8.07	7.57	7.10	6.65	6.24	5.85	5.48	5.14	4.82	4.52	4.24	3.97	3.73
7.1	15.7	14.8	13.8	13.0	12.2	11.4	10.7	10.0	9.40	8.81	8.26	7.74	7.26	6.81	6.38	5.98	5.61	5.26	4.93	4.62	4.33	4.06	3.81	3.57
7.2	15.0	14.0	13.2	12.3	11.6	10.8	10.2	9.53	8.94	8.38	7.85	7.36	6.90	6.47	6.07	5.69	5.33	5.00	4.69	4.40	4.12	3.86	3.62	3.40
7.3	14.1	13.2	12.4	11.6	10.9	10.2	9.58	8.98	8.42	7.89	7.40	6.94	6.50	6.10	5.72	5.36	5.03	4.71	4.42	4.14	3.88	3.64	3.41	3.20
7.4	13.1	12.3	11.6	10.8	10.2	9.52	8.93	8.37	7.85	7.36	6.90	6.47	6.06	5.69	5.33	5.00	4.69	4.39	4.12	3.86	3.62	3.39	3.18	2.98
7.5	12.1	11.4	10.7	9.99	9.36	8.78	8.23	7.72	7.24	6.78	6.36	5.96	5.59	5.24	4.91	4.61	4.32	4.05	3.80	3.56	3.34	3.13	2.93	2.75
7.6	11.0	10.4	9.70	9.10	8.53	8.00	7.50	7.03	6.59	6.18	5.79	5.43	5.09	4.78	4.48	4.20	3.94	3.69	3.46	3.24	3.04	2.85	2.67	2.51
7.7	9.94	9.32	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56	5.21	4.89	4.58	4.30	4.03	3.78	3.54	3.32	3.11	2.92	2.74	2.57	2.41	2.26
7.8	8.84	8.29	7.77	7.28	6.83	6.40	6.00	5.63	5.28	4.95	4.64	4.35	4.08	3.82	3.58	3.36	3.15	2.95	2.77	2.60	2.43	2.28	2.14	2.01
7.9	7.77	7.28	6.83	6.40	6.00	5.63	5.28	4.95	4.64	4.35	4.08	3.82	3.58	3.36	3.15	2.95	2.77	2.60	2.43	2.28	2.14	2.01	1.88	1.76
8	6.76	6.34	5.94	5.57	5.22	4.90	4.59	4.30	4.03	3.78	3.55	3.33	3.12	2.92	2.74	2.57	2.41	2.26	2.12	1.99	1.86	1.75	1.64	1.53
8.1	5.82	5.46	5.12	4.80	4.50	4.22	3.96	3.71	3.48	3.26	3.06	2.87	2.69	2.52	2.36	2.21	2.08	1.95	1.82	1.71	1.60	1.50	1.41	1.32
8.2	4.98	4.67	4.38	4.10	3.85	3.61	3.38	3.17	2.97	2.79	2.61	2.45	2.30	2.15	2.02	1.89	1.77	1.66	1.56	1.46	1.37	1.29	1.21	1.13
8.3	4.23	3.97	3.72	3.49	3.27	3.07	2.87	2.69	2.53	2.37	2.22	2.08	1.95	1.83	1.72	1.61	1.51	1.41	1.33	1.24	1.17	1.09	1.02	0.96
8.4	3.58	3.36	3.15	2.95	2.77	2.59	2.43	2.28	2.14	2.00	1.88	1.76	1.65	1.55	1.45	1.36	1.28	1.20	1.12	1.05	0.99	0.92	0.87	0.81
8.5	3.02	2.84	2.66	2.49	2.34	2.19	2.05	1.93	1.81	1.69	1.59	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.95	0.89	0.83	0.78	0.73	0.69
8.6	2.55	2.39	2.24	2.10	1.97	1.85	1.73	1.63	1.52	1.43	1.34	1.26	1.18	1.10	1.04	0.97	0.91	0.85	0.80	0.75	0.70	0.66	0.62	0.58
8.7	2.16	2.03	1.90	1.78	1.67	1.57	1.47	1.38	1.29	1.21	1.13	1.06	1.00	0.93	0.88	0.82	0.77	0.72	0.68	0.63	0.60	0.56	0.52	0.49
8.8	1.84	1.72	1.61	1.51	1.42	1.33	1.25	1.17	1.10	1.03	0.96	0.90	0.85	0.79	0.74	0.70	0.65	0.61	0.58	0.54	0.51	0.47	0.44	0.42
8.9	1.57	1.47	1.38	1.29	1.21	1.14	1.07	1.00	0.94	0.88	0.82	0.77	0.72	0.68	0.64	0.60	0.56	0.52	0.49	0.46	0.43	0.40	0.38	0.36
9	1.35	1.27	1.19	1.11	1.04	0.98	0.92	0.86	0.81	0.76	0.71	0.66	0.62	0.58	0.55	0.51	0.48	0.45	0.42	0.40	0.37	0.35	0.33	0.31

¹ The freshwater chronic water quality criteria for total ammonia where fish early life stages are present but freshwater mussels are absent were calculated using the following equation, which may also be used to calculate unlisted values:

Freshwater chronic water quality criterion for ammonia (fish early life stages absent and freshwater mussels absent)=CCC=

$$\left(0.9405 * \left(\frac{0.0278}{1 + 10^{7.688 - pH}} + \frac{1.1994}{1 + 10^{pH - 7.688}} \right) * \left(7.547 * 10^{0.028 * (20 - MAX(T, 7))} \right) \right)$$

Where MAX indicates the greater of the two values separated by a comma.

J.—K. (text unchanged.)